

Use of the Pectoralis Musculocutaneous Flap with Exposed Pedicle for Face and Neck Reconstruction

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ABSTRACT

The pectoralis major musculocutaneous flap is very important in face and neck reconstruction. First described with the use of a subcutaneous tunnel leading to the defect through the neck, its variation with use of an external pedicle is not widely reported.

This study represents the number of patients that underwent surgery with pectoralis major musculocutaneous flap with external pedicle, in the Hospital de Clínicas de Porto Alegre from February, 1991 to January, 1994. The data compared the advantages and complications with the literature wherein the internal pedicle technique is applied.

INTRODUCTION

The pectoralis major musculocutaneous flap (MCF), primarily described by ARIYAN⁽¹⁾, is one of the main alternatives for face and neck reconstruction. This is basically due to its constant anatomy and for being a flap of easy execution⁽³⁾.

Several studies have analyzed the use of this flap, describing the complications occurring in the type of reconstruction^(1, 2, 10, 11).

A few variables must be analyzed when intending to study such complications, among these the flap aims, the lesion extension, and the long term patient's functional state^(4, 5).

In the pectoralis muscle MCF, classically described⁽³⁾, a subcutaneous tunnel is used, through which the musculocutaneous component is taken up to the defect to be corrected. Revisions about the pectoralis muscle

MCF using exposed pedicle were not found.

This paper describes the experience in the use of this type of flap, showing the history cases, complications, and advantages of the pectoralis muscle MCF with exposed pedicle.

METHOD

All the cases of patients subjected to face and cervical reconstruction with musculocutaneous flaps of pectoralis muscle with exposed pedicle in the Plastic Surgery Service, Cranio-Maxillo-Facial Surgery Unit of the Hospital de Clínicas of Porto Alegre (HCPA) in the period of January, 1991 through January, 1994, were revised.

The patients were analyzed as to the following characteristics: sex, age, number of performed flaps, reconstruction purpose, presence of concomitant bone defect, use of alloplastic material, surgical time, interval for the flap release, reconstruction moment, internation time, dressing type in the exposed pedicle, and complications of the procedure.

RESULTS

Of the 15 patients subjected to rotation of musculocutaneous flap of pectoralis muscle with exposed pedicle, 13 were operated by the resident surgeons of the Plastic Surgery Service, Cranio-Maxillo-Facial Surgery Unit of the Hospital de Clínicas of Porto Alegre. The other two cases were operated by one of the service instructors.

The total amount of patients which took part in the sample was 15 individuals, 13 were male and 2 were female, with an average age of 62 years. A total of 17 flaps were prepared.

The musculocutaneous flap was used to reconstruct a facial defect caused by neoplasia (case 1) in 13 patients. One patient was subjected to surgery due to sequelae of paracoccidioidomycosis, and one patient presented high output arteriovenous malformation (case 2). Of these patients, 3 underwent the lower jaw reconstruction with plate: due to neoplasia, 2 presented defect due to parotidectomy, 2 underwent reconstruction of the mouth floor, one patient was operated because he presented exposed area of the common carotid artery, secondary to the neoplastic infil-

Case 1



Fig. 1 - Patient with maxilar basocellular neoplasia.

Fig. 1 - Paciente com neoplasian basocelular em região de maxila.



Fig. 2 - CT showing invasion of maxilar sinus.

Fig. 2 - CT evidenciando invasão de seio maxilar.



Fig. 3 - Post-resection defect showing the maxilar sinus.

Fig. 3 - Defeito pós-ressecção mostrando o seio maxilar.



Fig. 4 - Correction after MCF rotation.

Fig. 4 - Defeito corrigido após rotação de RMC de peitoral maior com pedículo externo.

tration, and 7 patients for facial defects reconstruction.

Out of the 15 patients subjected to this procedure, in 2 flaps were used bilaterally, one for the mouth floor reconstruction due to paracoccidioidomycosis, and another for lower jaw reconstruction after total necrosis of the flap prepared two weeks earlier, at the same time of the tumor excision.

The revision of the cases showed that the necessary period for the flap preparation and for its accommodation in the defect to be corrected was of 2½ hours (\pm 30 min.), the time necessary for the primary pathology excision being not included. Of the 17 prepared flaps, 15 occurred in the same anesthetic period for the basic sickness surgery and the other 2 flaps were prepared in another period, the first after total necrosis of the previous flap and the second after stabilization of high output arteriovenous malforma-

Table I

Author	Flaps	Patients	Necrosis	Partial Necrosis	Dehiscence	Fistula	Cervical Region	Donating Region	Other	Total
Veda	7	7	0	2	1	1	0	0	-	4
Robertson	28	28	-	1	2	7	-	-	-	13
Price	25	25	2	3	1	2	-	-	-	-
Kroll	168	168	4	29	43	35	-	-	32	143
Keidan	40	40	1	7	1	2	6	1	2	20
Froes*	17	15	2	2	0	3	0	0	7	8

* Pectoralis muscle MCF with exposed pedicle

tion of the face. The medium period of hospital internation of these patients was of 33,3 days (5-150 days) and the average time in which the exposed pedicle releases were performed was of 28 days.

Among the complications found, a patient presented total necrosis of the flap used for the reconstruction of the mouth floor, 4 days after the procedure. Two weeks after the débridement, he was subjected to a new rotation of pectoralis muscle MCF, which presented total necrosis on the 5th postoperative day, so that the defect had been corrected by the use of a deltopectoral flap.

Other complications were partial necrosis in two patients, fistulae in three cases, infection in 4 patients. Besides, a patient presented seroma and there was late exposition of the plate used for lower jaw reconstruction in another patient.

Of the 17 procedures in which the pectoralis muscle MCF with exposed pedicle was used, 5 received partial skin graft for the pedicle covering on the same surgical time of the reconstruction.

DISCUSSION

Several authors have reported their satisfaction with the short and long term results of the musculocutaneous flap of major pectoralis muscle⁽²⁾. Many studies tried to identify factors which could forecast the flap viability. Factors such as tabaccoism⁽⁸⁾, the inadequate flap handling, and the use of reconstruction plates⁽⁹⁾, appeared prejudicial to the flap survival.

Other factors as sex, laboratory values, and other clinical variables have no statistically significant influence⁽⁸⁾ for the flap viability.

There are also factors which are controversial, such as the patient's nutritional state, the previous irradiation^(7, 8), and the size of the defect to be reconstructed⁽⁸⁾.

The literature subdivides the complications with the

MCF in larger and smaller. The smaller ones include limited process of infection, small dehiscence, partial necrosis of the flap and limited fistulae. The larger complications are represented by the total necrosis and/or permanent fistulae, imposing a new procedure.

The literature revision shows that the complication indexes vary from 35 to 65 percent and the incidence of partial or total necrosis varies from 2 to 33 percent^(6, 12), in case of reconstruction with exposed pedicle. The results found in this study are comparable with the literature (Table I). And it is more significant if we consider that most patients (13 out of 15) were operated by training surgeons (resident doctors).

The facial and cervical region defects reconstruction with the use of MCF of major pectoralis muscle with exposed pedicle has a few characteristics that must be put in relief. When analyzing the surgical time, we

Case 2



Fig. 5 - Post-resection defect in a high output arteriovenous fistula.

Fig. 5 - Defeito pós-ressecção de EAV de alto débito em face.



Figs. 6 & 7 - Result after MCF rotation.

Figs. 6 e 7 - Resultado após rotação de RMC de peitoral maior com pedículo externo.

have observed that such procedure reduces considerably the operating time, since the time of the tunnel confection and of the accommodation of the flap are suppressed. Another important point is that a few complications of the tunnel confection, the hematoma, and the flap compression, for example, are discarded, reducing the risk as to the flap viability.

In the long term, the MCF with exposed pedicle presents a few advantages regarding the internal pedicle. The muscular pedicle, being sectioned around 28 days⁽⁶⁾ after the initial reconstruction, avoids an increase of volume in the preclavicular region.

Another factor observed in patients with MCF of major pectoralis muscle with internal pedicle is the retraction caused by the muscular atrophy. When the muscle begins the scarring process and atrophies itself, it starts to cause a cicatricial retraction in the tunnel region, which in a few cases forces the surgeon to reintervene, attacking the cervical region to release the fibrotic band. The muscular flap contraction was studied by SHINDO et al.⁽¹²⁾, who noticed a contraction in the muscular area of 41 to 45 percent of the tissue in all the patients.

The evidences showing the advantages of the use of the MCF of the pectoralis muscle with exposed pedicle are confronted with a few disadvantages. The procedure must count on the patient's cooperation, especially with reference to the care with the head moving. The muscular pedicle may be grafted or kept open with daily dressings up to its release. The patient must participate of the option, being informed of the advantages of grafting, since within 5 to 7 days the pedicle will be healed; he also must be aware of the disadvantages, since such procedure will require another dressing in the graft donor area and will involve an eventual sequel. We must remind the patient that the grafting will not reduce his period of hospitalization, since his permanence in the hospital has the objective of observing eventual complications of the musculocutaneous component of the flap, which more commonly occur around the 5th to the 7th day.

Another important point to be observed, mainly in the first week, is the formation of "elbow" in the pedicle. This may cause a reduction in the blood flow and put the flap viability at risk. For this, in the first 5 to 7 days, not only the patient, but also all the nursing team, are emphatically oriented as to the pedicle care.

The patient must also be informed that he shall be subjected to a new procedure after the flap integration. This procedure will provide the pedicle section and give the final touch to the pedicle.

The case history of the patients operated in the Plastic Surgery Service of the HCPA, during the studies period, is small, but even so the pectoralis muscle with exposed pedicle flap may be an interesting alternative, especially in patients who need a long surgical time for the base pathology excision.

Randomized prospective studies, analyzing also the procedure cost, must be performed in order to compare the advantages of one or another technique to be employed.

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